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Urban Green Space Studies with ERTS-1 imagery

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The utility of ERTS-1 imagery for urban green space studies is being investigated in connection with a research project financed by the Cooperative State Research Service (McIntire-Stennis) project NC-4042 entitled "Time interval multiband remote sensing for analyzing urban forested areas" for which the termination date is 1976.

ERTS-1 imagery is being used with standard air photography, with high altitude color infrared flown by NASA and multiband air photography flown with the University-owned SDC-10 camera. The first stages of the study have been directed to the problem of consistent identification of resources and observation of changes in these resources. Positive transparencies of ERTS-1 imagery have been used in overhead projectors to map urban green space resources. The results are consistent with similar work already accomplished by other ERTS-1 investigators and also as outlined in U.S.G.S. Circular 671 (1972) entitled, "A land-use classification system for use with remote sensor data."

Maps drawn from ERTS-1 9" x 9" transparency of frame 1081-15255-5 at scales of 1:156,000 and 1:45,000 were compared with maps from high altitude and normal air photography. The features that were mapped included roads, newly-opened bare ground, older bare ground, business districts wooded residential areas, forest and the urban boundary.

The changes that take place during a period of time are indicated on ERTS-1 imagery by (1) the bare ground and (2) by changes in the urban boundary. The former can be detected on the imagery by the prominent reflectances but the latter depends on both the reflectances and the judgment of the mapper as to where to draw the urban-rural boundary. For more consistent identification of both (1) and (2) for the urban area under study, a system of reference lines will be used, located so that they will be the same for different frames of the imagery, different reflectances and different dates. These reference lines will be used for intertemporal estimates of change in the two parameters: bare ground and urban boundary.

In order to identify change in more subtle utilization and management activities, such as thinning of forest stands in residential development, the reference line procedure will be used for imagery processed through the SDC 66 color additive viewer. If the range of colors can be related to resource changes, a technique will be available for better monitoring of urban resources.

Another aspect of urban resource studies to which ERTS-1 image analysis is being directed, is that of relating resource change to quality of urban life. The proliferation of bare ground in a section of the city can be a warning that controls need to be tightened on bulldozing. The relation of bare areas to residential areas and to water courses can indicate deterioration of neighborhoods and increases in erosion and sedimentation.

ERTS-1 frame 1099-15261-5 shows bead-like growth of bare ground to the northeast, northwest and west of the central business district. Future ERTS-1 imagery can provide an early-warning system for other bead-like environmental decay. Preliminary conclusions are that ERTS-1 imagery shows environmental decay more dramatically than does, for example, high altitude color infrared photography. The bright reflectances in ERTS-1 are more vivid than in the photos; apparently the light vegetation which covers many of the "decay" areas is softened by color IR, but the "decay" comes through in full force in the ERTS-1 images.